MA 35 J(85)-1

CURRENT INDUSTRIAL REPORTS

Selected Industrial Air Pollution Control Equipment

1985

MA35J(85)-1
Issued July 1986

U.S. Department of Commerce
BUREAU OF THE CENSUS

SUMMARY OF FINDINGS

Shipments of industrial air pollution devices in 1985 totaled $781.4 million, of which $422.1 million were particulate emissions collectors, $317.5 million were gaseous emissions control devices, and $41.9 million were other types of air pollution control equipment.

Shipments to steam electric utility power plants totaled $430.5 million. Shipments to other end users included steam industrial power plants, $55.8 million; iron and steel mills, $26.9 million; and chemical and fertilizer producers, $38.0 million.

New orders and backlog of orders dropped 7 and 25 percent, respectively, in 1985 compared with 1984.

A description of the survey methodology and related information appears on page 5.

Table 1. VALUE OF SHIPMENTS OF SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT: 1985 AND 1984

(Value in thousands of dollars)

Product code	Product description	1985	1984
35646 --	Selected industrial air pollution control equipment	781,414	763,558
	Particulate emissions collectors	422,060	429,151
	Gaseous emissions control devices	317,457	282,708
	Other types of industrial air pollution control equipment	41,897	51,699

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Table 2. COMPARISON OF VALUES OF SHIPMENTS OF SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT, AS REPORTED IN THE MA35J, THE 1984 ANNUAL SURVEY OF MANUFACTURES, AND THE 1982 CENSUS OF MANUFACTURES

(Value in thousands of dollars)

Product code	Product description	1984			1982	
			Annual Survey of Manufactures			
		MA35J	Value	Standard error of estimates[1]	MA35J	Census of Manufactures
35646	Dust collection and other air purification equipment for industrial gas cleaning systems	763.6	(NA)	(NA)	905.2	(NA)
	Shipped by manufacturing establishments	(NA)	404.7	4	(NA)	336.2
	Shipped by all establishments including design-construction firms	763.6	(NA)	(NA)	905.2	(NA)

Note: Comparable estimates from the 1985 Annual Survey of Manufactures will be published at a later date.

(NA) Not available.

[1]The annual survey of manufactures percentage standard errors shown are the approximate relative errors of the estimates of level. A more detailed description of the standard error of estimate is given in the introduction of the annual survey of manufactures, Value of Product Shipments, M84(AS)-2, under "Qualifications of the Data."

Table 3. NEW ORDERS, SHIPMENTS, AND BACKLOG OF ORDERS FOR SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT: 1985 AND 1984

(Quantity in number of units; value in thousands of dollars)

Product code	Product description	Number of companies	New orders[1]		Shipments		Backlog of orders, December 31	
			Quantity	Value	Quantity	Value	Quantity	Value
	1985							
35646 --	Selected industrial air pollution control equipment	131	(X)	450,805	(X)	781,414	(X)	893,322
	Particulate emissions collectors	(NA)	(X)	370,393	(X)	422,060	(X)	389,365
35646 51	Electrostatic precipitators	20	112	128,302	201	187,534	144	262,143
35646 54	Fabric filters	61	26,459	190,502	21,295	180,558	10,345	106,954
35646 55	Mechanical collectors	42	5,567	22,949	5,507	26,881	1,261	8,042
35646 58	Wet scrubbers	44	1,443	28,640	1,453	27,087	1,304	12,226
	Gaseous emissions control devices	(NA)	(X)	43,088	(X)	317,457	(X)	494,229
35646 62	Catalytic oxidation systems	8	626	13,893	557	13,612	109	3,461
35646 64	Thermal and direct oxidation systems	12	280	16,251	251	14,610	53	4,506
35646 65	Scrubbers (gas absorber)	16	702	-32,770	654	37,395	183	35,709
35646 66	Flue gas desulfurization systems	13	63	42,363	214	247,949	292	441,556
35646 67	Gas adsorbers	9	[a]105	[a]3,351	[a]70	[a]3,891	[a]109	[a]8,997
35646 68	Other types of industrial air pollution control equipment	14	(X)	37,324	(X)	41,897	(X)	9,728
	1984							
35646 --	Selected industrial air pollution control equipment	130	(X)	485,034	(X)	763,558	(X)	1,183,417
	Particulate emissions collectors	(NA)	(X)	301,981	(X)	429,151	(X)	487,516
35646 51	Electrostatic precipitators	21	146	103,130	216	216,278	158	380,120
35646 54	Fabric filters	60	24,421	137,375	19,267	157,660	8,609	84,470
35646 55	Mechanical collectors	42	6,627	32,342	6,559	30,438	1,203	11,327
35646 58	Wet scrubbers	45	1,464	29,134	1,312	24,775	931	11,599
	Gaseous emissions control devices	(NA)	(X)	142,700	(X)	282,708	(X)	680,788
35646 62	Catalytic oxidation systems	8	109	12,485	100	12,491	27	3,024
35646 64	Thermal and direct oxidation systems	13	279	14,397	236	13,944	71	5,161
35646 65	Scrubbers (gas absorber)	18	637	51,311	616	22,692	155	69,112
35646 66	Flue gas desulfurization systems	13	119	60,332	208	228,934	430	599,357
35646 67	Gas adsorbers	8	[b]133	[b]4,175	[b]110	[b]4,647	[b]107	[a]4,134
35646 68	Other types of industrial air pollution control equipment	17	(X)	40,353	(X)	51,699	(X)	15,113

Note: Ending backlog of orders for 1984 plus new orders for 1985 minus shipments for 1985 does not necessarily equal backlog for 1985.

The percent of estimation of each item is estimated as follows (see "Description of Survey" for a discussion of estimation of missing reports): [a]15 to 25 percent of this item is estimated. [b]26 to 50 percent of this item is estimated.

(NA) Not available. (X) Not applicable.

[1]Cancellations of prior orders are represented by treating the order as a negative new order. It is possible to have a negative new order as reported in product code 35646 65 scrubbers (gas absorber).

Table 4. VALUE OF SHIPMENTS OF SELECTED AIR POLLUTION CONTROL EQUIPMENT, BY END USE: 1985 AND 1984

(Thousands of dollars)

Product code	Product description	Total shipments	Steam electric utility power plants	Steam industrial power plants	Coal mining and cleaning	Petroleum refining	Foundries	Iron and steel mills	Primary nonferrous metal smelting plants	Chemical and fertilizer production	Cement manufacturing	Grain milling and handling	Pulp and papermill operations	Other end use industries
	1985													
35646 --	Selected industrial air pollution control equipment	781,414	430,482	55,765	2,782	13,258	4,445	26,931	4,079	37,992	11,378	4,556	31,246	[1]158,500
	Particulate emissions collectors	422,060	142,655	46,231	2,782	7,913	4,256	24,531	4,079	25,443	11,378	4,556	30,230	118,006
35646 51	Electrostatic precipitators	187,534	111,767	15,805	(D)	(D)	(D)	2,119	(D)	(D)	(D)	(D)	20,896	32,810
35646 54	Fabric filters	180,558	30,175	26,105	1,355	716	(D)	21,504	3,476	16,573	10,451	3,163	(D)	60,531
35646 55	Mechanical collectors	26,881	(D)	(D)	(D)	(D)	(D)	(D)	107	(D)	477	1,325	(D)	13,067
35646 58	Wet scrubbers	27,087	(D)	(D)	(D)	(D)	(D)	(D)	(D)	7,772	(D)	(D)	5,886	11,598
	Gaseous emissions control devices	317,457	261,362	(D)	-	5,345	(D)	(D)	(1)	(D)	-	(1)	(D)	[1]30,987
35646 62	Catalytic oxidation systems	13,612	(D)	(D)	-	-	-	(D)	-	(D)	-	-	(D)	8,077
35646 64	Thermal and direct oxidation systems	14,610	(D)	-	-	(D)	(D)	(D)	-	(D)	-	-	(D)	[1]7,996
35646 65	Scrubbers (gas absorber)	37,395	(D)	(D)	-	(D)	(D)	(D)	(1)	5,350	-	(1)	(D)	[1]6,163
35646 66	Flue gas desulfurization systems	247,949	240,182	(D)	-	(D)	-	-	-	(D)	-	-	(D)	(D)
35646 67	Gas adsorbers (nonliquid)	3,891	(D)	(D)	-	-	-	-	-	(D)	-	-	-	(D)
35646 68	Other types of industrial air pollution control equipment	41,897	26,465	(D)	(1)	-	-	(D)	-	(D)	-	-	(D)	[1]9,507
	1984													
35646 --	Selected industrial air pollution control equipment	763,358	445,757	46,556	3,421	12,514	5,707	22,689	5,728	34,931	9,546	4,459	23,968	[1]148,082
	Particulate emissions collectors	429,151	185,056	40,547	3,421	7,681	5,619	21,712	5,728	23,173	9,546	4,459	22,733	99,533
35646 51	Electrostatic precipitators	216,278	141,367	18,028	-	(D)	-	(D)	(D)	-	-	-	18,544	34,664
35646 54	Fabric filters	157,660	40,990	14,299	1,469	1,127	4,686	20,473	4,420	14,817	9,175	3,440	1,025	41,839
35646 55	Mechanical collectors	30,438	(D)	(D)	(D)	(D)	(D)	(D)	152	650	(D)	1,019	733	14,082
35646 58	Wet scrubbers	24,775	(D)	(D)	(D)	653	(D)	(D)	(D)	7,306	(D)	-	3,091	8,948
	Gaseous emissions control devices	282,708	230,021	(D)	-	4,833	(D)	(D)	(1)	12,162	-	-	(D)	[1]30,946
35646 62	Catalytic oxidation systems	12,491	(D)	(D)	-	-	-	-	-	(D)	-	-	(D)	7,812
35646 64	Thermal and direct oxidation systems	13,944	(D)	-	-	(D)	(D)	(D)	-	(D)	-	-	(D)	7,614
35646 65	Scrubbers (gas absorber)	22,692	(D)	(D)	-	2,412	-	(D)	(1)	4,633	-	-	(D)	4,707
35646 66	Flue gas desulfurization systems	228,934	219,170	(D)	-	(D)	-	(D)	-	(D)	-	-	(D)	7,206
35646 67	Gas adsorbers (nonliquid)	4,647	(D)	(D)	-	-	-	-	-	(D)	-	-	(D)	3,607
35646 68	Other types of industrial air pollution control equipment	51,699	30,680	(D)	(1)	-	(D)	(D)	-	596	(1)	-	(D)	[1]17,603

- Represents zero. (D) Data withheld to avoid disclosing figures for individual companies. In some cases figures which are otherwise publishable are withheld to avoid disclosure from higher-level totals.

[1] Includes other types of industrial air pollution control equipment used in coal mining and cleaning and grain milling and handling as well as scrubbers used in primary nonferrous metal smelting plants.

Table 5. VALUE OF SHIPMENTS AND EXPORTS OF SELECTED INDUSTRIAL AIR POLLUTION CONTROL EQUIPMENT: 1985 AND 1984

(Value in thousands of dollars)

Product code[1]	Product description	Manufacturers' shipments	Exports of domestic merchandise[2]	Estimated producers' value[3]	Percent exports to manufacturers' shipments
	1985				
35646 --	Selected industrial air pollution control equipment	781,414	39,768	35,401	5
	1984				
35646 --	Selected industrial air pollution control equipment	763,558	45,538	40,538	6

[1]Comparison of SIC-based product class code with Schedule B export number is as follows:

Product code	Schedule B export number	Description
35646--	661.9805	Electrostatic precipitators for industrial use
	661.9808	Industrial gas cleaning equipment, n.s.p.f.
	661.9825	Dust collection and air purification equipment

N.s.p.f. Not specially provided for.

[2]Source: Bureau of the Census report EM 546, U.S. Exports.

[3]This value was derived by use of adjustment factors to exclude freight, insurance, and other charges incurred in moving goods to the port of export. This adjustment is made to convert the values to an approximation of the producers' value of exported goods. Current adjustment factors are based on data for 1983 which are published in Origin of Exports of Manufactured Products, M83(AS)-5, appendix B. The adjustment factor for this report is 0.8902.

DESCRIPTION OF SURVEY

Scope of Survey. This survey covers firms engaged in the manufacture of selected industrial air pollution control equipment.

Survey Methodology. The statistics in this publication were collected by mail on Bureau of the Census annual Form MA35J, Selected Air Pollution Control Equipment. The survey panel includes all known manufacturers of the selected products specifically designed for use in air pollution control, approximately 136 companies.

Reliability of Data. Survey error may result from several sources: (1) inability to obtain information about all cases in the survey; (2) response errors; (3) definitional difficulties; (4) differences in the interpretation of questions; (5) mistakes in recording or coding the data obtained; and (6) other errors of collection, response, coverage, and estimation for missing data. These nonsampling errors also occur in complete censuses. Although no direct measurement of the biases due to nonsampling errors has been obtained, precautionary steps were taken in all phases of the collection, processing, and tabulation of the data in an effort to minimize their influence.

A major source of bias in the published estimates is due to imputing data for nonrespondents, for late reporters, and for data which fail logic edits. Missing figures are imputed based on yearly movements shown by reporting firms. Imputation generally is limited to a maximum of 15 percent for any one data cell. Figures with imputation rates greater than 15 percent are footnoted.

The imputation rate is not an explicit indicator of the potential error in published figures due to nonresponse because the actual yearly movements for nonrespondents may or may not closely agree with the imputed movements. The range of difference between the actual and imputed figures is not precisely known, but is assumed to be small. The degree of uncertainty regarding the accuracy of the published data increases as the percentage of imputation increases. Figures with imputation rates above 15 percent should be used with caution.

Revisions to Previous Period Data. Statistics for previous years may be revised as the result of corrected data from respondents, late reports for which imputations were made as described above, or other corrections. Figures which have been revised by more than 5 percent from previously published figures are indicated by footnotes.

Revisions include changes to prior period data resulting from reconciliation of the results of this survey with the 1984 Annual Survey of Manufactures to correct differences in reported data between the two series and to identify and verify new establishments included in the scope of this survey. Table 2 presents a comparison of data from the two series by census product class following the reconciliation.

Adjustment for Price Change. All dollar figures included in this publication are in current dollars; i.e., they have not been adjusted for price change.

EXPLANATION OF TERMS

Value of Shipments. Represents the value of physical shipments of all products sold, transferred to other establishments of the same company, or shipped on consignment, whether for domestic or export sale. The value represents the net sales price, f.o.b. plant, to the customer or branch to which the products are shipped, net of discounts, allowances, freight charges, and returns. Shipments to a company's own branches are assigned the same value as comparable sales to unaffiliated customers; i.e., the value includes an appropriate allocation of company overhead and profit. Products bought and resold without further manufacture are excluded.

Net New Orders (Bookings). Orders received during the year minus all cancellations received during the same year. Net new orders are defined to include (a) the sales value of orders accepted during the reporting period for products and services to be delivered at some future date; (b) plus the sales value of orders received during the reporting period for immediate delivery; (c) plus or minus the net sales value of contract change documents which increase, decrease, (or equal), the sales values of previous orders when the parties concerned are in substantial agreement as to the amount involved. Included as orders are only those orders that are supported by binding legal documents, such as signed contracts, letters or awards, or letters of intent. In the case of letters of intent, the full amount of sales value is included if the parties concerned were in substantial agreement on this amount; other wise, only the funds specially authorized to be expanded are included. Orders received and canceled during the year are excluded.

Backlog of Orders. All orders that have not yet been reflected as shipments. Generally, unfilled orders at the end of the reporting period are equal to unfilled orders at the end of the prior period, plus net new orders received, less net shipments.

Particulate Emissions Collectors

Electrostatic Precipitator. A device which separates aerosal particulate matter (solid or liquid) from industrial gases by imparting an electric charge to the particles and removing them from the gas stream with the force created by an electric field.

Fabric Filter. A device in which the dustbearing gas is passed through a fabric in such a manner that the dust particles are retained on the up stream or "dirty" gas side of the fabric, while the cleaned gas passes through the fabric to the down stream or clean gas side, where it is removed by natural and/or mechanical means. The fabric may be of any fibrous material, natural or manmade.

Mechanical Collector. A device for the separation in a dry state of entrained particulate material from a gas stream by the application of one or a combination of the following forces; centrifugal, inertial, and gravitational.

Wet Scrubber. A device for the removal of particulate contaminants from a gas stream by means of intimate contact with scrubbing liquid. (If water is added in any form, consider it a scrubber, except wetted wall electronic precipitators and those devices which are primarily mechanical collectors.)

Gaseous Emissions Control Devices

Catalytic Oxidation Systems. A device for the removal of combustible air contaminants in which the contaminant-laden stream is preheated by a suitable heating mechanism, then passed through a catalyst bed that initiates and promotes oxidation of the combustible contaminants to carbon dioxide, water vapor, and other compounds less noxious than those originally in the gas stream.

Thermal and Direct Oxidation Systems

Thermal Oxidation System. A device for the correction of combustible air contaminants in which the contaminant-laden gas stream is passed over a burner or other suitable preheat devices to a thermal residence chamber where the contaminant materials are oxidized to carbon dioxide, water vapor, and other materials less noxious than those originally in the gas stream.

Direct Oxidation System. A device for the destruction of concentrated combustible or oxidant streams in which the air contaminant is reacted directly with a fuel or with oxidizing air in a burner flame and the products of combustion exhausted into the atmosphere directly or through a suitable incineration chamber and stack.

Scrubber (Gas Absorber). A device for the removal of soluble or reactive gaseous material from gas streams by contacting the stream with water, aqueous chemical solution, or other scrubbing liquids. The process involves a chemical reaction.

Flue Gas Desulfurization Systems (FGD). Chemical process plants designed primarily for the removal of sulfur oxides from gaseous products of combustion emitted to the atmosphere from the use of fossil fuels in boilers or other combustion devices operated for the generation of thermal or combustion devices operated for the generation of thermal or electric energy. The system extends from gas inlet to gas discharge, including all required auxiliaries and controls.

Gas Absorber. A device for the removal of air contaminants by absorption on a surface-active solid, such as activated carbon or molecular sieves. Depending on the application, the absorbent is either discarded or regenerated.

COMPARISON OF EXPORT, IMPORT, AND DOMESTIC OUTPUT DATA

The Standard Industrial Classification (SIC) system used for domestic output and the statistical export and import commodity classifications were developed independently. This results in considerable difficulty in comparing the three types of data for many commodity areas. The domestic output classification is based on type of industry; on the other hand, the export and import classification system is more materials oriented. Also, since there are a substantial number of imported commodities which are have no comparable domestic output classification. The relationships shown in this report should be considered only as approximations, since, in addition to the problems mentioned above, there are also the following problems affecting the comparability of the three sets of data.

Valuation. There are different methods of valuation for the three types of data:

- *Domestic Output*—Valued at the point of production. It includes the net sales price, f.o.b. plant, after discounts and allowances, exclusive of freight charges and excise taxes.

- *Exports*—Valued at the point of exportation. It includes the selling price, or cost if not sold, and inland freight, insurance and other charges to the export point.

  Estimated producers' values of exports have also been developed. These values more closely approximate the values reported for domestic output because they exclude freight, insurance, and other charges applied from the producing plant to the export point.

- *Imports*—Valued at the first port of entry in the United States. It includes c.i.f. (cost, insurance, and freight), duty, and other charges to the import point.

Duplication in Quantity and Value of Output. Because producers' shipments of some commodities may be used as materials for incorporation into other commodities, combinations of data for such commodities may contain a certain amount of duplication. Thus, percentages of exports to output or imports to apparent consumption (output plus imports minus exports) at four-digit or broader levels may be understated. Where duplication is known to be substantial, the output data are appropriately noted in the table.

Low-Value Import and Export Transactions. Detailed commodity information is not included for individual export shipments valued at not more than $1,000. Generally, detailed commodity information is not included for individual import shipments valued at not more than $1,000. For textiles and textile products, gloves, footwear, and miscellaneous rubber and plastics products, detailed commodity information is not included for individual import shipments valued at not more than $250. This is believed to have only negligible effects on the statistics for the bulk of the commodities.

Manufacturers' Shipments, Not Specified by Kind. The value of manufacturers' shipments at the four-digit industry level often

includes a small amount which is not distributed among the individual five-digit product classes. Export and import percentages at the more detailed levels might, therefore, be slightly overstated.

Time Lag Between Output and Exports. There will be a lag between the time a commodity is produced or shipped by the producer and the time it is actually exported, especially when intermediaries (wholesalers, exporters, etc.) are involved. Ordinarily, this type of discrepancy is insignificant in annual figures.

"Direct" vs "Total" Commodity Exports and Imports. Export and import data do not include materials which are incorporated into other more finished products and exported or imported in finished form. Thus, by showing only direct exports and imports, the relation of exports to output and imports to apparent consumption for intermediate products is considerably understated.

Used Commodities. With a few exceptions, used or rebuilt commodities are classified in the same import or export codes as is new merchandise. Percentages are thus overstated to the extent that used or rebuilt products are significant in trade.

Geographic Area of Coverage. Import and export data reflect the movement of merchandise into and out of U.S. foreign trade zones, the U.S. Virgin Islands, and the U.S. customs territory (includes the 50 States, the District of Columbia, and Puerto Rico).

HISTORICAL NOTE

Data on selected air pollution control equipment have been collected by the Bureau of the Census since 1971. Historical data may be obtained from Current Industrial Reports available at your local Federal Depository Library. A list of these libraries may be obtained from the Bureau of the Census regional offices:

Office	Telephone
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Kansas City, Kansas	(816) 374-4601
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